Dreaming, Vol. 5, No. 1, 1995

Lucid Dreaming, Waking Personality and Cognitive Development

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Findings are presented from a comparison of waking personality traits (16PF, Cattell, Eber, & Tatsuoka, 1970) characteristic of male and female groups totaling 247 frequent, and 201 infrequent lucid dreamers. Discriminant analyses produced significant findings and similar profiles, for both males and females. Overall, findings are considered suggestive of a strong link between lucid awareness and volition within dreams and the management of waking cognition and emotion. Additionally, support is provided for previously established relationships between lucid dream occurrence and field independence. Results are discussed from a perspective considering the lucid dream phenomenon to be a valuable vantage point from which to explore relationships between dream function and waking cognition. Within this framework, current findings of differences between frequent and infrequent lucid dreamers are postulated to involve variations in the functioning of specific cognitive/developmental processes related to the regulation and discrimination of internally arising subjective aspects of perception.

KEY WORDS: dream; lucid dreaming; personality.

Lucid dreams (characterized by the awareness that one is dreaming) are typically described as being exceptionally vivid, with the dreamer often experiencing positive affect and extraordinary control over dream self and imagery. In fact, volitional control of cognitive functioning within these dreams is often described as virtually identical with that of waking consciousness, creating the paradoxical feeling of actually being awake within a dream (LaBerge, Nagel, Dement, and Zarcone, 1981; Tart, 1979).

Surveys show that a sizeable proportion of the population reports having experienced a lucid dream at some time in their life. This varies from a high of 70 percent for college students (Blackmore, 1982a), to a low of 56 percent from a non-student population (Palmer, 1979). However, most people who have experienced lucid dreams report that they are a rare occurrence, with fewer than 10% of those surveyed regarding themselves as frequent lucid dreamers (Kohr, 1980;

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1053-0797/95/0300-0001$07.50/1 © 1995 Association for the Study of Dreams

Palmer, 1979). These marked individual differences in rate of occurrence, along with the unusual juxtaposition of radically different states of consciousness, have prompted recent attempts to use lucid dreaming as a tool for investigating both dreaming function and waking awareness.

EXPLORING LUCID DREAM ONSET

Turning their attention to factors relating to the onset of lucidity, a number of investigators note that lucid dreamers often mention noticing inconsistencies within the dream, that lead them to question the dream's reality. In this regard, Garfield (1975) found that analyzing an ongoing dream by noting incongruous images, recognizing a "dream-like" quality and more general self-reflectivity, were common triggers of lucidity. Likewise, Tyson *et al.* (1984) claimed that lucidity often arises when a person develops "a critical attitude towards the dream by questioning the apparent reality of the dream" (p. 442).

Applying these findings, various techniques have been developed to increase lucid dream frequency. LaBerge (1980) and Garfield (1974) both reported significant increases in the frequency of their own lucid dreams following the use of presleep suggestion. Along similar lines, Tholey (1983) reported developing techniques for inducing and manipulating lucid dreams that involved increasing self-reflectivity and critical thought during waking. Similarly, Purcell, Mullington, Moffitt, Hoffmann, and Pigeau (1986) have used waking self-reflectiveness to increase the frequency of self-reflective and lucid dreaming. Using a different approach, applications of a mild electric shock (Hearne, 1983) and a flashing red light (LaBerge and Rheingold, 1990) during sleep have also been found to be successful in triggering lucid dream onset.

HYPOTHESES EXPLAINING LUCID DREAM OCCURRENCE

Difficulties finding a place for lucid dreaming within classical dream theories, where suspension of higher ego functions is seen as basic to the dreaming process, have led to various explanations attempting to disregard the phenomena. Freud (1900/1965), who viewed dreams as a primitive primary process mode of thinking, explained lucidity as thoughts defensively added upon waking in order to alleviate anxiety; yet in a later work (Freud, 1901/1952) allowed that lucidity could occur during a dream "if the content of a dream goes too far in overstepping the censorship" (p. 101). Eventually, psychodynamic theory came to explain lucidity as "a momentary expression of non-regressed ego functioning" (Fosshage, 1983, p. 644). Similarly, Hartmann (1975) hypothesized that reports of waking cognition within dreams were actually due to confusion during brief awakenings, while Gackenbach (1978) explored the related possibility that lucid dreams might be thoughts and images experienced during the process of falling asleep and waking up. However, the electrophysiological measurements paired with prearranged signaling from within lucid dreams (using eye movements and breathing rate), have clarified this

issue, conclusively demonstrating that lucid dreams do indeed occur during REM sleep and often last several minutes (Hearne, 1978; LaBerge *et al.*, 1981).

More promising approaches to understanding lucid dream occurrence have focused on uncovering waking characteristics differentiating frequent from infrequent lucid dreamers. In this regard, Ogilvie, Hunt, Tyson, Lucescu, and Jenkins (1982) hypothesized that frequent lucid dreamers have developed an improved capacity for simultaneous detached observation and self-reflection, allowing them to maintain a detached observational attitude within complex situations. A related hypothesis focuses more specifically on processes involving the ability to differentiate internal from external sources of information. In this regard, Gruber (1985) suggested that the capability to accurately identify and control subjective perceptions, interpretations, and distortions while awake, might carry over into the dream state. Similarly, Gackenbach, Heilman, LaBerge and Boyt (1985) proposed that individual differences in degree of psychological differentiation (also referred to as field dependence/independence), would be useful in accounting for differences in frequency of lucid dream occurrence. In addition, we can note that all of these suggestions appear closely related to Witkin's (1969) more general observation that "relatively differentiated persons are likely to use a mechanism of 'distancing' " (p. 327) in both dreaming and waking that allows them to stand aside as onlookers of their own ongoing activity.

Following the above hypotheses, we might conclude that individual differences in self-reflectivity may be a key piece to the lucid dream puzzle. However, on close examination we find that two distinct possibilities branch from this observation. First, it is possible that the very activity of maintaining a self-reflective frame of reference during waking results in self-reflection, and therefore, lucidity while dreaming. As previously mentioned, Tholey (1983) and Purcell *et al.* (1986) successfully used this as a technique to induce lucid dreaming. On the other hand, it is also possible that the act of maintaining a self-reflective attitude results in increased knowledge or access to inner feelings and conflicts, and that it is actually this greater self-awareness that promotes lucidity. In this regard, Cartwright (1974) claimed that the greater access an individual has to affective responses in waking life, the more parallel waking and dreaming mentation will be. Corriere, Hart, Karle, Binder, Gold, and Woldenberg (1977) provided evidence for this, stating that increased awareness of feelings can lead to a shift from a *symbolic* to a clearer *directly expressive* mode of dreaming. Correspondingly, from a psychodynamic viewpoint, Fosshage (1983) also claimed that it is in large part the degree of recognition and acceptance of inner conflicts that determines the amount of discrepancy between latent and manifest dream content. Directly relating this line of thought to lucid dreaming, Palmer (1979) hypothesized that lucid dream frequency is a reflection of the degree to which the conscious mind is capable of gaining access to contents of the unconscious. Recently, Gackenbach (1991) suggested that lucid dreaming may be related to any practice which deepens self-awareness, stating that she "views dream lucidity, when it emerges 'naturally' as a manifestation of the 'self' becoming increasingly aware of itself" (p. 117).

INVESTIGATIONS OF WAKING CORRELATES

In attempting to explore the above hypotheses, a number of empirical studies investigating waking correlates of lucid dreaming have been conducted, but have for the most part resulted in unclear or insignificant findings. For example, Blackmore (1982a, b) reported both positive and negative correlations between reported frequency of dream recall and lucid dream occurrence, and a lack of correlation with mental imagery ability. Belicki, Hunt, and Belicki (1978) in a study of 20 lucid and 38 nonlucid dreamers found no significant relationships between lucid dream occurrence and measures of cognitive complexity, self-esteem, dream recall, dream bizarreness, or attention paid to dreams. Hearne (1978) also reported inconclusive results from a study of 24 male and 24 female students, comparing frequency of lucid dreaming with extroversion/introversion, observational powers, and intelligence. Gackenbach (1978) did report finding relationships between lucid dream occurrence and positive self-concept, field dependence, dream recall, low neuroticism, and low anxiety. However, although significant, correlations were small and occurred in a nonrepresentative population. In a series of investigations, Gackenbach *et al.* (1985) reported finding support for a link between frequent lucid dreaming and field independence. Yet, while they reported strong support for men, results for women were considered inconclusive.

Along these lines, following a review of differences between frequent and infrequent lucid dreamers on various perceptual and motor tasks, Snyder and Gackenbach concluded that while "on one level of interpretation . . . lucidity is related to field independence . . . on a higher level of inference would be the statement that lucidity is also related to the broad construct of psychological differentiation" (1988, p. 237). Also reported in this review are contradictory findings from various studies regarding anxiety—with male lucid dreamers showing higher levels of anxiety and female lucid dreamers showing lower levels. Likewise conflicting results regarding introversion/extroversion are discussed. Finally, Spadafora and Hunt (1990) reported finding that lucid dreamers performed better on tasks measuring spatial-analytic ability then either their nightmare or archetypal dreamers.

THE PRESENT STUDY

In considering possible explanations for the lack of definitive findings in these studies it appears that the use of relatively small sample sizes, as well as the specific trait measures employed, may not have provided either adequate scope or sensitivity needed for uncovering potentially subtle individual differences. In an attempt to address these considerations, the present study employed 25 scales from the 16PF, widely considered to be a well validated and comprehensive measure of waking personality (Cattell, 1989; Cattell, Eber, & Tatsuoka, 1970; Krug, 1981), and a sample of 247 frequent and 201 infrequent lucid dreamers.

METHOD

While taking part in a study of the relationship between dreaming style and waking personality, 1,775 students at the University of Cincinnati were administered the Dreaming Style Questionnaire (DSQ) (Gruber, 1988), consisting of 95 Likert scale items, designed to provide a comprehensive survey of experiential/stylistic components of the dreaming process. Information on test-retest reliability, construct validity, and factor structure are presented in Gruber (1988). The DSQ includes a definition of lucid dreaming, as well as an example of a lucid dream, in order to improve understanding of this sometimes misunderstood concept. This was followed by a question asking subjects to report the frequency of their lucid dreams on a seven point scale demarcated "never," "a few times in my life," "once a year or less," "a few times a year," "every few months," "once or twice a month," and "once a week or more." Studies have confirmed the validity of questionnaire estimates of lucid dream frequency, showing significant positive correlations between self-reported estimates and frequencies from analyses of dream diaries (Snyder & Gackenbach, 1988). Additionally, 814 of these subjects were administered Form A of the 16 Personality Factor Questionnaire (Cattell *et al.*, 1970).

The measures were administered to groups of approximately 20 subjects at a time. The DSQ was administered first, assuring consistent conditions for all subjects regardless of whether one or both questionnaires were given. A code was used to identify each set of questionnaires in order to assure anonymity. Stepwise discriminant analysis procedures were employed to compare frequent with infrequent lucid dreamers on the 16 primary personality traits and nine composite scales measured by the 16PF. Due to difficulties low dream recallers might have encountered when responding to the DSQ, subjects who reported recalling a dream once a month or less were removed from analysis. Removal of low recallers also addresses the need to control for dream recall frequency when measuring lucid dream frequency, as discussed by Snyder and Gackenbach (1988) in their review of individual differences associated with lucid dreaming.

Individual 16PF variables were considered to be meaningful discriminators if they appeared on the discriminant function or if their total structure coefficient (the product moment correlation between a single variable and the discriminant function) was .30 or above. Because the composite variables are linear combinations of the primary scales, the two sets of variables were analyzed separately. Men and women were also analyzed separately in order to explore for possible sex differences.

RESULTS AND DISCUSSION

Eight-seven percent of men and 84 percent of women reported having had a lucid dream at some time in their life. The fact that these figures are somewhat higher than previous findings reported by Blackmore (1982a), Palmer (1979), and Kohr (1980) of 79%, 71%, and 70% respectively, probably can be attributed to removal of low dream recallers prior to analysis—which may have helped separate

true non-lucid dreamers from individuals simply recalling very few dreams of any type.

For the purpose of exploring personality correlates associated with lucid dream occurrence, subjects with 16PF data were divided into groups of frequent and infrequent lucid dreamers—with frequent lucid dreamers identified as those reporting lucid dreams *once a week or more* or *once or twice a month* (134 men and 113 women), and infrequent lucid dreamers responding *a few times in my life* or *never* (91 men and 110 women). Stepwise discriminant analysis procedures for both men and women showed significant discrimination between the frequent and infrequent lucid dreaming groups at $P < .01$ for both primary and composite 16PF variables, with close correspondences between the male and female personality characteristics identified. Means, standard deviations, and initial (step 0) significants levels of the univariate F's for groups of male and female frequent and infrequent lucid dreamers are presented in Table 1. Results of the discriminant analyses are presented in Table 2. Variables are presented in order of importance, as determined by the magnitude of their total structure coefficients. Variables actually appearing on the discriminant function are marked with an asterisk. The descriptors representing the opposing poles of the 16PF scales have been placed under the groups they actually refer to, so that negative and positive correlations should be interpreted according to their absolute value—negative correlations do not indicate the reverse of the trait specified. Table 3 shows classification results for males and

Table I. Means, Standard Deviations, and Univariate F for Groups of Male and Female Frequent and Infrequent Lucid Dreamers

16PF Scale	Freq. LD		Infreq. LD		Sign. of Unvariate F
	M	SD	M	SD	
		MALE			
H	5.6	2.0	4.9	2.1	.01
Q4	6.1	2.0	6.7	1.9	.02
Q1	6.4	1.9	5.8	1.7	.03
C	4.9	1.9	4.8	1.9	.76
O	5.6	1.8	6.1	1.7	.04
E	6.4	2.0	6.0	1.9	.20
A	4.9	2.1	4.6	2.1	.46
F	6.2	2.1	5.7	2.2	.13
IV	6.5	2.0	5.7	2.0	.01
VI	5.5	1.8	6.0	1.7	.03
		FEMALE			
H	5.9	1.9	5.1	2.1	.003
F	6.4	2.3	6.0	2.3	.36
E	6.6	1.8	6.2	1.9	.13
Q2	6.0	1.9	6.2	1.7	.66
A	5.0	2.2	4.7	2.2	.37
Q1	6.5	1.9	5.9	1.8	.03
IV	6.4	1.9	5.7	1.9	.01

Table II. Comparison of Frequent and Infrequent Lucid Dreamers

	Male Frequent and Infrequent Lucid Dreamers		
	Freq. Lucid Dreamers (N = 134)	Infreq. Lucid Dreamers (N = 91)	TSC
	Primary Scales (P < .002)		
H*	Bold	Shy	.61
Q4*	Relaxed	Tense	–.57
Q1*	Experimenting	Conservative	.55
C	Emotionally Stable	Affected by Feelings	.46
O	Self-Assured	Apprehensive	–.42
E	Dominant	Submissive	.37
A	Warm	Cool	.34
F	Enthusiastic	Sober	.33
	Secondary Scales (P < .01)		
IV*	Independence	Subduedness	1.00
VI	Adjustment	Neuroticism	–.41
	Female Frequent and Infrequent Lucid Dreamers		
	Freq. Lucid Dreamers (N = 113)	Infreq. Lucid Dreamers (N = 110)	TSC
	Primary Scales (P < .001)		
H*	Bold	Shy	.80
F	Enthusiastic	Sober	.54
E	Dominant	Submissive	.53
Q2	Group-Oriented	Self-Sufficient	–.31
A	Warm	Cool	.30
Q1	Experimenting	Conservative	.30
	Secondary Scales (P < .01)		
IV*	Independence	Subduedness	1.00

*Variables on the Discriminant Function
Note: TSC = Total Structure Coefficient

females using the discriminant functions derived from analyses of the 16PF primary scales.

An examination of the significant 16PF primary factors shows both male and female lucid dreamers to be characterized as *socially bold* (H), *dominant* (E), *experimenting* (Q1), *enthusiastic* (F), and *warm* (A). Conversely, the opposing poles of these dimensions describe individuals who are *shy*, *submissive*, *conservative*, *restrained*, and *cool*. In addition, female lucid dreamers are described as *group oriented* (Q2), and males as *relaxed* (Q4), *emotionally stable* (C), *self-assured* (O), and *adjusted* (V1). These findings strongly suggest that frequent lucid dreamers, characterized by the unusual degree of control they often exhibit within the dream state, are also better able to manage or control various aspects of cognitive, emotional, and social functioning while awake.

Table III. Classification Results Using 16PF Primary Scales

Actual Group	No. of Cases	Predicted Group	
		Freq. LD.	Infreq. LD
	MALE		
Frequent	134	77	57
Lucid Dreamers		57.5%	42.5%
Infrequent	91	32	59
Lucid Dreamers		35.2%	64.8%
Percent of Grouped Cases Correctly Classified 60.44%			
	FEMALE		
Frequent	113	72	41
Lucid Dreamers		63.7%	36.3%
Infrequent	110	43	67
Lucid Dreamers		39.1%	60.9%
Percent of Grouped Cases Correctly Classified 62.33%			

Turning to the 16PF composite scales, representing more global traits, we find that the *subduedness/independence* factor is the only one to discriminate both male and female frequent from infrequent lucid dreamers. Individuals scoring high on this factor are described as independent, aggressive, daring, incisive, and likely to exhibit considerable initiative, while those scoring low on this dimension are described as group dependent, passive, and in need of external support (Cattell *et al.*, 1970). Interestingly, when defining this factor further Cattell *et al.* report it to correspond with the individual differences in personality and perception identified by the field dependence/independence distinction, supporting previously reported links between lucid dream frequency and field independence (Gackenbach *et al.*, 1985; Gackenbach & Bosveld, 1989). This correspondence, along with results from the previous studies mentioned, suggests that a closer look at this construct may help to elucidate mechanisms underlying lucid dream occurrence.

Lucid Dreaming and Psychological Differentiation

We should first note that the link between Cattell's measure of independence and Witkin's concept of field independence or psychological differentiation has not been conclusively established. While a number of studies show support for this connection (Cattell, 1969; Cattell & Hundleby, 1968; Haynes & Carley, 1970), others do not (Ohnmacht, 1968; Johnson, Neville, & Workman, 1969). However, Cattell *et al.* argue convincingly that typically used measures of field independence that rely solely on tasks involving visual perception (i.e., the rod and frame test and hidden figures tests) may be measuring a narrow, non-personality perceptual field independence factor, or even more narrowly, a "perceptual instruments" factor, "within a somewhat restricted perceptual variable domain" (1968, p. 733), and that

this perceptual tendency is only part of a far broader personality factor of independence.

This would seem to concur with Witkin's view of field dependence/independence as a cognitive style, linked to the broad notion of psychological differentiation, involving "contrasting tendencies to rely primarily on external referents or on the self in psychological functioning" (Witkin, Goodenough, & Oltman, 1979, p. 1131).

In fact considerable research has shown the field dependence/independence dimension to extend beyond perceptual functioning (ability to distinguish figure from ground), to encompass a wide range of personality or cognitive characteristics of an individual. In a review of this literature, Yalom (1980) refers to this dimension as a "pervasive cognitive style, evident in the individual's intellectual activities, body concept, and sense of separate identity" (p. 15). He describes field dependent individuals as relying "heavily on external sources for definition of their attitudes, judgments, sentiments, and their views of themselves," while reporting that field independent individuals have "a developed sense of separate identity . . . an awareness of needs, feelings, attributes that they recognize as their own and that they identify as distinct from those of others" (p. 154).

Of particular interest here, are aspects of these descriptions that are indicative of individual differences in ability to discern internal from external sources of information. Here, one particular task used to measure field independence clearly highlights this aspect of the construct. When attempting to adjust a tilted chair to an upright position in a tilted room, field independent individuals are able to separate themselves from the position of the room and find the upright position, while field dependent individuals are not. For the field dependent individual, externally given information (the position of the room) is confused with internally generated experience (bodily position), while the field independent individual appears better able to distinguish between them. It can therefore be deduced that frequent lucid dreamers, *defined by their ability to differentiate internally generated dream experiences from external reality while sleeping*, are also better able to clearly distinguish internally arising subjective experiences from external stimuli while awake. Adding this to the 16PF primary scale findings discussed above, we can ascertain that the emergence of self-reflection and volitional control within the dream state appears directly related to the abilities to both recognize and to regulate the subjective elements of perception and experience while awake.

CONCLUSIONS

Although our current findings lend support to the suggestion of a link between lucid dream frequency and psychological differentiation (Gackenbach *et al.*, 1985), it is clear that findings can also be interpreted as lending support to each of the previously mentioned hypotheses. Included here are *capacity for detached observation* (Ogilvie *et al.*, 1982); *emphasis on self-reflectivity* (Tholey, 1983); *ability to access contents of the unconscious* (Palmer, 1979); and *discernment of subjectivity* (Gruber, 1985). In fact, it appears that all of these may be describing a common process

involving stepping back from and reflecting on internally originating experience. In support of this it can be noted here that an ability to *distance oneself* from one's ongoing mental activity is a commonly emphasized element in a number of basic theories of cognitive development. We can include here, Piaget's (1977) concept of *perceptual decentering*, Mead's (1934) *taking the role of the other*, and Melanie Klein's (Segal, 1974) *testing fantasy against reality.*

Continuing within this cognitive/developmental perspective, we can conclude that individual differences in frequency of lucid dream occurrence can at least in part be accounted for by differences in the efficiency or effectiveness of basic cognitive processes, comprising a stable, *state independent* capacity, that we have determined to be primarily involved with discerning and controlling internally arising aspects of perception and experience.

Within an information processing context, we can further speculate that individual variations in the degree of control exhibited over dream imagery — exemplified most clearly by the striking contrasts between lucid dreaming and nightmare experiences (Gruber, 1988) — *actually coincide with the degree of volitional control an individual is able to exhibit over the "non-conscious" adaptive processing functions widely held to be carried out during REM sleep.* Our current analysis would therefore support others (LaBerge, 1981; Hunt, 1982) in suggesting that one very important benefit to arise from lucid dreaming may involve an increased awareness of the active role one plays in interpreting and assigning meaning to experience in the construction of one's subjective world.

ACKNOWLEDGMENTS

This article was prepared from dissertation work completed in 1988 at the University of Cincinnati. We would like to thank the Department of Psychology at the University of Cincinnati for support in completing this research. We gratefully acknowledge the assistance of Roger Stuebing, Athena Markou, Bharti Katbamna among others at the University of Cincinnati Institute for Policy Research for valued help with data analysis.

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